



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,641	07/09/2003	William H. Howland	1880-031286	3435
28289	7590	01/21/2004	EXAMINER	
WEBB ZIESENHEIM LOGSDON ORKIN & HANSON, P.C. 700 KOPPERS BUILDING 436 SEVENTH AVENUE PITTSBURGH, PA 15219			NGUYEN, VINCENT Q	
			ART UNIT	PAPER NUMBER
			2858	

DATE MAILED: 01/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/616,641	HOWLAND, WILLIAM H.
	Examiner	Art Unit
	Vincent Q Nguyen	2858

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) This action is **FINAL**.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-8 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. §§ 119 and 120

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
 a) The translation of the foreign language provisional application has been received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s) _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>10/06/2003</u> . | 6) <input type="checkbox"/> Other: _____ .                                  |

**DETAILED ACTION**

**Objection**

1. Claim 3 recites the limitation "carries" in line 1. There is insufficient antecedent basis for this limitation in the claim. For the purpose of examination, examiner assumes that the carriers are the doping concentrations.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Faktor et al. (4,168,212).

Regarding claim 1, Faktor et al. discloses an apparatus for determining doping concentration of a semiconductor wafer comprising (figure 6) a probe (13) having an electrically conductive tip and an electrical insulator covering at least a distal end of the conductive tip; means (21) for applying a capacitance-voltage (CV) type electrical stimulus between the electrically conductive tip (13) and a semiconductor wafer (18) when the electrical insulator is in contact with the semiconductor wafer; means (28) for measuring a CV response of the semiconductor wafer to the CV type electrical stimulus;

and means (27) for determining from the CV response a doping concentration of the semiconductor wafer (Column 12, lines 48-62) (See also figure 1).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2, 3, 8, are rejected under 35 U.S.C. 103(a) as being unpatentable over Faktor et al. (4,168,212).

Regarding claim 2, Faktor et al. discloses every subject matter recited in the claim except for the doping concentration is determined for a near surface region of the semiconductor wafer adjacent the electrical insulator. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the determination of the doping concentration, which is near surface region of the semiconductor wafer adjacent the electrical insulator into the system of Faktor et al. because the metal oxide semiconductor field effect transistor (MOSFET), for example, has two wells in a wafer adjacent to the surface insulator. The two wells are highly doped. Thus, in order to determine the doping concentration, only the region (The well region) of the semiconductor wafer adjacent the electrical insulator is to be determined because the concentration outside the well regions in a wafer is insignificant compared to the well regions.

Regarding claim 3, Faktor does not disclose the doping concentrations (carriers) are one of P-type carriers and N-type carriers. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to recognize that the doping concentration must be either N-type or P-type carriers because they are principal of semiconductor.

Regarding claim 8, Faktor et al. does not explicitly disclose the electrical insulator contacts one of a semiconductor material of the semiconductor wafer (18) and a dielectric or oxide layer overlaying the semiconductor material (Figure 6). However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to recognize that the elements such as the electrical insulator contacts one of a semiconductor material of the semiconductor wafer (18) and a dielectric or oxide layer overlaying the semiconductor material (Figure 6) are not only true for the prior art of Faktor et al. but also true for any prior art of semiconductor since those elements are inevitable elements of the semiconductor.

6. Claims 4, 7, are rejected under 35 U.S.C. 103(a) as being unpatentable over Faktor et al. (4,168,212) in view of Mazur et al. (6,492,827).

Regarding claim 4, Faktor et al. does not disclose a shaft of the probe adjacent the electrically conductive tip.

Mazur et al. discloses a system similar to that of Faktor et al. and further discloses a shaft (42) for the purpose of conveying the probe above the wafer.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the shaft as taught by Mazur et al. into the system of Faktor et al. to move the probe over certain place of the wafer to determine the concentration since the concentration is not distributed entire the wafer.

Regarding claim 7, Faktor et al. does not disclose conductive tip is formed from an elastically deformable material.

Mazur et al. discloses a system similar to that of Faktor et al. and further discloses a conductive tip is formed from an elastically deformable material (Column 9, lines 42-44) for the purpose of enhancing the contact in measuring the concentration (Column 2, lines 37-53).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the conductive tip is formed from an elastically deformable material as taught by Mazur et al. into the system of Faktor et al. because it would have been desirable to enhance the contact of the conductive tip to the wafer to enhance the concentration measurement (Mazur's column 2, lines 37-53).

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Faktor et al. (4,168,212) in view of Long et al. (6,069,485).

Regarding claim 5, Faktor et al. discloses every subject matter recited in the claim except for a Metal-oxide-semiconductor (MOS).

Long et al. discloses a system similar to that of Faktor et al. and further discloses the MOS (Figure 1) for the purpose of calculating the width of the depletion, channel doping.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the MOS as taught by Long et al. into the system of Faktor et al. because the system for determining the concentration in a wafer as taught by Faktor et al. would perform well in determining the concentration of the MOS since the system of Faktor et al. is designed for determination of the concentration of semiconductor which would include the MOS and since the determination does not require the system to change its function.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Faktor et al. (4,168,212) in view of Davari et al. (4,621,233).

Regarding claim 6, Faktor et al. discloses every subject matter recited in the claim except for measuring means measures the CV response to within one Debye length from the interface of the electrical insulator and the semiconductor wafer.

Davari et al. discloses a system similar to that of Faktor et al. and further discloses means measures the CV response to within one Debye length from the interface of the electrical insulator and the semiconductor wafer (Davari et al.'s column 1 lines 35-40) for the purpose of enhancing the measurement (Davari et al.'s entire column 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the means measures the CV response to within one Debye length from the interface of the electrical insulator and the semiconductor wafer as taught by Davari et al. into the system of Faktor et al. because the penetration depth inside the semiconductor is a function of the measurement.

***Contact Information***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vincent Q Nguyen whose telephone number is (703) 308-6186 or (571) 272-2234 if calling after January 27, 2004. The examiner can normally be reached on Mon-Fri 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le can be reached on (571) 272-2233. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vincent Q. Nguyen



January 15, 2004